

1.0 SEWER AND SANITATION

The design developments for sewer network for the current and proposed development for Umdoni are tabulated below:

Table 1(a) EXISTING/ SHORT TERM CURRENT FLOWS HOUSEHOLDS SEWER CONSUMPTION

| WARD | HOUSEHOLDS | NUMBER OF HOUSE HOLDS | SEWER CONSUMPTION (l/day/household) | STORMWATER INFILTRATION | RESERVE CAPACITY | PEAK FACTOR | PEAK FLOW (m ³ /day) |
|--------------|------------|-----------------------|-------------------------------------|-------------------------|------------------|-------------|---------------------------------|
| 1 | Low | 2200 | 500 | 15% | 1.5 | 2.5 | 4744 |
| 2 | Low | 2500 | 500 | 15% | 1.5 | 2.5 | 5391 |
| 3 | Middle | 2300 | 750 | 15% | 1.5 | 2.5 | 7439 |
| 4 | Middle | 3700 | 750 | 15% | 1.5 | 2.5 | 11967 |
| 5 | Middle | 1500 | 750 | 15% | 1.5 | 2.5 | 4852 |
| 6 | Low | 1900 | 500 | 15% | 1.5 | 2.5 | 4097 |
| 7 | Middle | 2500 | 750 | 15% | 1.5 | 2.5 | 8086 |
| 8 | Low | 1100 | 500 | 15% | 1.5 | 2.5 | 2372 |
| 9 | Low | 1600 | 500 | 15% | 1.5 | 2.5 | 3450 |
| TOTAL | | | | | | | <u>52397</u> |

Table 1(b) MEDIUM TERM CURRENT FLOWS HOUSEHOLDS SEWER CONSUMPTION

| WARD | HOUSEHOLDS | NUMBER OF HOUSE HOLDS | SEWER CONSUMPTION (l/day/household) | STORMWATER INFILTRATION | RESERVE CAPACITY | PEAK FACTOR | PEAK FLOW (m ³ /day) |
|--------------|------------|-----------------------|-------------------------------------|-------------------------|------------------|-------------|---------------------------------|
| 1 | Low | 3100 | 500 | 15% | 1.5 | 2.5 | 6684 |
| 2 | Low | 7500 | 500 | 15% | 1.5 | 2.5 | 16172 |
| 3 | Middle | 4150 | 750 | 15% | 1.5 | 2.5 | 13423 |
| 4 | Middle | 4100 | 750 | 15% | 1.5 | 2.5 | 13261 |
| 5 | Middle | 2500 | 750 | 15% | 1.5 | 2.5 | 8086 |
| 6 | Low | 2200 | 500 | 15% | 1.5 | 2.5 | 4744 |
| 7 | Middle | 5000 | 750 | 15% | 1.5 | 2.5 | 16172 |
| 8 | Low | 3700 | 500 | 15% | 1.5 | 2.5 | 7978 |
| 9 | Low | 2150 | 500 | 15% | 1.5 | 2.5 | 4636 |
| TOTAL | | | | | | | 91155 |

Table 1(c) LONG TERM CURRENT FLOWS HOUSEHOLDS SEWER CONSUMPTION

| WARD | HOUSEHOLDS | NUMBER OF HOUSEHOLDS | SEWER CONSUMPTION (l/day/household) | STORMWATER INFILTRATION | RESERVE CAPACITY | PEAK FACTOR | PEAK FLOW (m ³ /day) |
|--------------|------------|----------------------|-------------------------------------|-------------------------|------------------|-------------|---------------------------------|
| 1 | Low | 4000 | 500 | 15% | 1.5 | 2.5 | 8625 |
| 2 | Low | 5000 | 500 | 15% | 1.5 | 2.5 | 10781 |
| 3 | Middle | 6000 | 750 | 15% | 1.5 | 2.5 | 19406 |
| 4 | Middle | 4500 | 750 | 15% | 1.5 | 2.5 | 14555 |
| 5 | Middle | 3500 | 750 | 15% | 1.5 | 2.5 | 11320 |
| 6 | Low | 2500 | 500 | 15% | 1.5 | 2.5 | 5391 |
| 7 | Middle | 7500 | 750 | 15% | 1.5 | 2.5 | 24258 |
| 8 | Low | 2600 | 500 | 15% | 1.5 | 2.5 | 5606 |
| 9 | Low | 2700 | 500 | 15% | 1.5 | 2.5 | 5822 |
| TOTAL | | | | | | | 105764 |

Table 2(a) EXISTING /SHORT TERM INDUSTRIAL DEVELOPMENT SEWER CONSUMPTION

| WARD | INDUSTRIAL DEVELOPMENT (ha) | SEWER CONSUMPTION (l/day/ha) | STORMWATER INFILTRATION | RESERVE CAPACITY | PEAK FACTOR | PEAK FLOW (m ³ /day) |
|--------------|-----------------------------|------------------------------|-------------------------|------------------|-------------|---------------------------------|
| 3 | 0.0082 | 20000 | 15% | 1.5 | 2.5 | 0.7098 |
| 4 | 0.0103 | 45000 | 15% | 1.5 | 4.0 | 2.0009 |
| 7 | 0.0088 | 20000 | 15% | 1.5 | 2.5 | 0.7592 |
| TOTAL | | | | | | <u>3.4699</u> |

Table 2(b) FUTURE/ LONG TERM INDUSTRIAL DEVELOPMENT SEWER CONSUMPTION

| WARD | INDUSTRIAL DEVELOPMENT (ha) | SEWER CONSUMPTION (l/day/ha) | STORMWATER INFILTRATION | RESERVE CAPACITY | PEAK FACTOR | PEAK FLOW (m ³ /day) |
|--------------|-----------------------------|------------------------------|-------------------------|------------------|-------------|---------------------------------|
| 3 | 0.02779 | 20000 | 15% | 1.5 | 2.5 | 2.3969 |
| 4 | 0.08477 | 45000 | 15% | 1.5 | 4.0 | 16.4516 |
| 6 | 0.01832 | 20000 | 15% | 1.5 | 2.5 | 1.580 |
| 7 | 0.0088 | 20000 | 15% | 1.5 | 2.5 | 0.759 |
| 9 | 0.00609 | 45000 | 15% | 1.5 | 4.0 | 1.1825 |
| TOTAL | | | | | | <u>22.3701</u> |

Table 3(a) EXISTING/ SHORT TERM SEWER TREATMENT PLANT CAPACITY CHECKS

| CATCHMENT | WARD | DEVELOPMENT | SEWER STORAGE REQUIREMENTS | TOTAL SEWER STORAGE REQUIREMENTS | EXISTING TREATMENT CAPACITY (m ³ /day) | COMMENTS |
|-----------|------|---------------------------|----------------------------|----------------------------------|---|--|
| A | 1 | Industrial Residential | 0 2200 | 4700 | 0 | The rural areas currently have VIP and Septic tanks sewer system |
| | 2 | Industrial Residential | 0 2500 | | | |
| | 8 | Industrial Residential | 0 3700 | 5300 | 0 | Upgrading required to meet current demand |
| | 9 | Industrial Residential | 0 1600 | | | |
| B | 3 | Industrial Residential | 0.710 2300 | 4201 | 2250 | Upgrading required to meet current demand |
| | 6 | Industrial Residential | 0 1900 | | | |
| C | 4 | Industrial Residential | 2.0009 3700 | 5202 | 2500 | Upgrading required to meet current demand |
| | 5 | Industrial Residential | 0 1500 | | | |
| D | 7 | Industrial Residential | 0.7592 2500 | 2501 | 2000 | Upgrading required to meet current demand |

A - Rural Areas

B - Umzinto Waste Water Treatment Plant

C - Scottburgh Waste Water Treatment Plant

D - Pennington Waste Water Treatment Plant

Table 3(b)

LONG TERM SEWER TREATMENT PLANT CAPACITY CHECKS

| CATCHMENT | WARD | DEVELOPMENT | SEWER STORAGE REQUIREMENTS | TOTAL SEWER STORAGE REQUIREMENTS | EXISTING TREATMENT CAPACITY (m ³ /day) | COMMENTS |
|-----------|------|---------------------------|----------------------------|----------------------------------|---|--|
| A | 1 | Industrial Residential | 0 4000 | 9000 | 0 | The rural areas currently have VIP and Septic tanks sewer system |
| | 2 | Industrial Residential | 0 5000 | | | |
| | 8 | Industrial Residential | 0 2600 | 5301 | 0 | Upgrading required to meet current demand |
| | 9 | Industrial Residential | 1.1825 2700 | | | |
| B | 3 | Industrial Residential | 2.397 6000 | 8504 | 2250 | Upgrading required to meet current demand |
| | 6 | Industrial Residential | 1.580 2500 | | | |
| C | 4 | Industrial Residential | 16.452 4500 | 8016 | 2500 | Upgrading required to meet current demand |
| | 5 | Industrial Residential | 0 3500 | | | |
| D | 7 | Industrial Residential | 0.759 7500 | 7501 | 2000 | Upgrading required to meet current demand |

A - Rural Areas

B - Umzinto Waste Water Treatment Plant

C - Scottburgh Waste Water Treatment Plant

D - Pennington Waste Water Treatment Plant

2.0 WATER

The design developments for sewer network for the current and proposed development for Umdoni are tabulated below:

Table 4.

POPULATION BY WARD

| AREA (m2) | AREA (ha) | Type of Settlement | | | | | | | TOTAL |
|--------------|----------------|--------------------|------|--------------|-------|----------|------------|-------------|--------------|
| | | Population | | | | | | | Population |
| | | Rural | Farm | Smallholding | Urban | Informal | Industrial | Institution | |
| 8317.411 | 0.8317 | 7857 | | | | | | | 7857 |
| 8411.143 | 0.8411 | 8839 | | | | | | | 8839 |
| 6311.960 | 0.6312 | | | 499 | 7713 | | 332 | | 8544 |
| 15272.985 | 1.5273 | 2873 | 239 | | 3617 | 2573 | | 880 | 10182 |
| 8989.930 | 0.8990 | | 587 | | 3098 | | | | 3685 |
| 644.623 | 0.0645 | 3208 | 531 | 418 | 2781 | | | | 6938 |
| 50745.940 | 5.0746 | | 1202 | 284 | 5380 | | | | 6866 |
| 6292.421 | 0.6292 | 3715 | | | | | | | 3715 |
| 7045.104 | 0.7045 | 5668 | | | | | | | 5668 |
| TOTAL | 11.2032 | Population | | | | | | | 62294 |

Table 4.1

AREAS PER WARDS

| WARD | AREA (m2) | AREA (ha) | Type of Settlement | | | | | | TOTAL | |
|------|-----------|-----------|--------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | | | Rural | Farm | Smallholding | Urban | Informal | Industrial | | Institution |
| 1 | 8317.411 | 0.8317 | 0.832 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.832 |
| 2 | 8411.143 | 0.8411 | 0.841 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.841 |
| 3 | 6311.960 | 0.6312 | 0.000 | 0.000 | 0.037 | 0.570 | 0.000 | 0.025 | 0.000 | 0.631 |
| 4 | 15272.985 | 1.5273 | 0.431 | 0.036 | 0.000 | 0.543 | 0.386 | 0.000 | 0.132 | 1.527 |
| 5 | 8989.930 | 0.8990 | 0.000 | 0.143 | 0.000 | 0.756 | 0.000 | 0.000 | 0.000 | 0.899 |
| 6 | 644.623 | 0.0645 | 0.030 | 0.005 | 0.004 | 0.026 | 0.000 | 0.000 | 0.000 | 0.064 |
| 7 | 50745.940 | 5.0746 | 0.000 | 0.888 | 0.210 | 3.976 | 0.000 | 0.000 | 0.000 | 5.075 |
| 8 | 6292.421 | 0.6292 | 0.629 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.629 |
| 9 | 7045.104 | 0.7045 | 0.705 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.705 |

Table 4.2

AREAS PER FACILITIES

| WARD | AREA (m2) | AREA (ha) | Type of Settlement | | | | TOTAL |
|--------------|-----------|-----------|--------------------|--------------|--------------|-----------|---------------|
| | | | CLINIC | HALL | LIBRARY | S/FIELD | |
| 1 | 8317.411 | 0.8317 | | | | 1 | 1 |
| 2 | 8411.143 | 0.8411 | 1 | 1 | | | 2 |
| 3 | 6311.960 | 0.6312 | | 1 | 1 | 1 | 3 |
| 4 | 15272.985 | 1.5273 | | 1 | 1 | 1 | 3 |
| 5 | 8989.930 | 0.8990 | 1 | 1 | 1 | 3 | 6 |
| 6 | 644.623 | 0.0645 | 1 | | 2 | | 3 |
| 7 | 50745.940 | 5.0746 | 1 | 2 | 2 | | 5 |
| 8 | 6292.421 | 0.6292 | 1 | 1 | | 4 | 6 |
| 9 | 7045.104 | 0.7045 | | | | | 0 |
| | | | 5 | 7 | 7 | 10 | 29 |
| TOTAL | | | 41587 | 42000 | 63000 | | 146587 |
| | | | litres/day | litres/day | litres/day | | litres/day |

Table 4.3

WATER DEMAND

| WARD | AREA (m ²) | AREA (ha) | Type of Settlement | | | | | | TOTAL | |
|--------------|------------------------|-----------|--------------------|--------------|--------------|----------------|---------------|------------|--------------------|-----------------|
| | | | Rural | Farm | Smallholding | Urban | Informal | Industrial | | |
| | | | UNIT OF MEASURE | | | | | | | |
| | | | People | Area | Area | People | People | Area | | |
| 1 | 8317.411 | 0.8317 | 471420 | 0.000 | 0.000 | 0 | 0 | 0.000 | 471420.000 | |
| 2 | 8411.143 | 0.8411 | 530340 | 0.000 | 0.000 | 0 | 0 | 0.000 | 530340.000 | |
| 3 | 6311.960 | 0.6312 | 0 | 0.000 | 84.787 | 617040 | 0 | 490.536 | 617615.324 | |
| 4 | 15272.985 | 1.5273 | 172380 | 537.749 | 0.000 | 542550 | 205840 | 0.000 | 921307.749 | |
| 5 | 8989.930 | 0.8990 | 0 | 2148.069 | 0.000 | 464700 | 0 | 0.000 | 466848.069 | |
| 6 | 644.623 | 0.0645 | 192480 | 74.004 | 8.933 | 222480 | 0 | 0.000 | 415042.937 | |
| 7 | 50745.940 | 5.0746 | 0 | 13325.798 | 482.774 | 807000 | 0 | 0.000 | 820808.572 | |
| 8 | 6292.421 | 0.6292 | 222900 | 0.000 | 0.000 | 0 | 0 | 0.000 | 222900.000 | |
| 9 | 7045.104 | 0.7045 | 340080 | 0.000 | 0.000 | 0 | 0 | 0.000 | 340080.000 | |
| TOTAL | | | 1929600 | 16086 | 576 | 2653770 | 205840 | 491 | 4806362.651 | |
| | | | litres/day | litres/day | litres/day | litres/day | litres/day | litres/day | | |
| | | | | | | | | | 4806.363 | KL/day |
| | | | | | | | | | 4.806 | ML/day |
| | | | | | | | | | 55.629 | litres/s |
| | | | | | | | | | * WITHOUT PEAKS | |

| PROPOSED CIVIL INFRASTRUCTURE PACKAGES | | | |
|---|----------------|---------------------|---|
| WARD | SERVICE | TERM | PROJECT |
| 1 | Roadworks | Short (0-5 years) | 1. Upgrading of existing road 2. Provision of public transport facilities |
| | | Medium (5-10 years) | None |
| | | Long (>10 years) | Upgrade north-south link road to 4 lanes |
| | Sewer | Short (0-5 years) | None |
| | | Medium (5-10 years) | None |
| | | Long (>10 years) | Provide sanitation facilities for any future expansion |
| | Water | Short (0-5 years) | None |
| | | Medium (5-10 years) | None |
| | | Long (>10 years) | Upgrading of existing reservoir to meet demand |
| 2 | Roadworks | Short (0-5 years) | 1. Upgrading of existing road 2. Provision of public transport facilities |
| | | Medium (5-10 years) | None |
| | | Long (>10 years) | Upgrade north-south link road to 4 lanes |
| | Sewer | Short (0-5 years) | None |
| | | Medium (5-10 years) | None |
| | | Long (>10 years) | Provide sanitation facilities for any future expansion |
| | Water | Short (0-5 years) | None |
| | | Medium (5-10 years) | None |
| | | Long (>10 years) | Upgrading of existing reservoir to meet demand |
| 3 | Roadworks | Short (0-5 years) | 1. Upgrading of existing road 2. Provision of public transport facilities 3. CBD Road to be upgraded to 4 lanes |
| | | Medium (5-10 years) | None |
| | | Long (>10 years) | Upgrading of existing Provincial Road |
| | Sewer | Short (0-5 years) | Upgrading of existing WWTW for existing developments |
| | | Medium (5-10 years) | Upgrading of Umzinto WWTW |
| | | Long (>10 years) | Upgrading of WWTW to meet future developments |
| | Water | Short (0-5 years) | None |
| | | Medium (5-10 years) | None |

| | | | |
|----------|-----------|---------------------|---|
| | | Long (>10 years) | Upgrading of existing Reservoir to meet future demand |
| 4 | Roadworks | Short (0-5 years) | 1. Upgrading of existing road 2. Provision of public transport facilities |
| | | Medium (5-10 years) | Upgrading of Provincial Road |
| | | Long (>10 years) | Upgrading of R102 between Scottburgh and Pennington to 4 lanes |
| | Sewer | Short (0-5 years) | None |
| | | Medium (5-10 years) | Upgrading of existing WWTW to meet current needs |
| | | Long (>10 years) | Upgrade Scottburgh WWTW for future developments |
| | Water | Short (0-5 years) | None |
| | | Medium (5-10 years) | Upgrading of existing reservoir |
| | | Long (>10 years) | Upgrading of existing reservoir for future expansion |
| 5 | Roadworks | Short (0-5 years) | 1. Upgrading of existing road 2. Provision of public transport facilities |
| | | Medium (5-10 years) | Upgrading of R102 |
| | | Long (>10 years) | Upgrading of R102 between Scottburgh and Pennington to 4 lanes |
| | Sewer | Short (0-5 years) | None |
| | | Medium (5-10 years) | Upgrading of Scottburg WWTW |
| | | Long (>10 years) | Upgrading of WWTW to meet future expansion |
| | Water | Short (0-5 years) | None |
| | | Medium (5-10 years) | Upgrading of existing reservoir |
| | | Long (>10 years) | Upgrading of existing reservoir for future demand |
| 6 | Roadworks | Short (0-5 years) | 1. Upgrading of existing road 2. Provision of public transport facilities 3. CBD Road to be upgraded to 4 lanes |
| | | Medium (5-10 years) | None |
| | | Long (>10 years) | Upgrade north-south link road to 4 lanes |
| | Sewer | Short (0-5 years) | Upgrading of existing WWTW for existing developments |
| | | Medium (5-10 years) | Upgrading of Umzinto WWTW |
| | | Long (>10 years) | Upgrading of WWTW to meet future developments |

| | | | |
|----------|-----------|---------------------|---|
| | Water | Short (0-5 years) | None |
| | | Medium (5-10 years) | Upgrading of existing reservoir |
| | | Long (>10 years) | Upgrading of existing reservoir for future demand |
| | | | |
| 7 | Roadworks | Short (0-5 years) | 1. Upgrading of existing road 2. Provision of public transport facilities |
| | | Medium (5-10 years) | Upgrading of R102 between Scottburgh and Pennington to 4 lanes |
| | | Long (>10 years) | 1. N2 interchange into Pennington 2. N2 interchange into Bazley |
| | | | |
| | Sewer | Short (0-5 years) | Upgrading of Pennington WWTW for current |
| | | Medium (5-10 years) | Upgrading of WWTW for future developments |
| | | Long (>10 years) | Upgrading of WWTW for future developments |
| | | | |
| | Water | Short (0-5 years) | None |
| | | Medium (5-10 years) | Upgrading of existing reservoir |
| | | Long (>10 years) | Upgrading of existing reservoir for future demand |
| | | | |
| 8 | Roadworks | Short (0-5 years) | 1. Upgrading of existing road 2. Provision of public transport facilities |
| | | Medium (5-10 years) | None |
| | | Long (>10 years) | Upgrading of Provincial Road |
| | | | |
| | Sewer | Short (0-5 years) | None |
| | | Medium (5-10 years) | 1. Upgrade for long term development 2. Construct new bulk sewer line to Pennington WWTW |
| | | Long (>10 years) | Upgrading of Pennington WWTW for future developments |
| | | | |
| | Water | Short (0-5 years) | None |
| | | Medium (5-10 years) | New bulk water line to be provided |
| | | Long (>10 years) | Upgrading of WWTW |
| | | | |
| 9 | Roadworks | Short (0-5 years) | 1. Upgrading of existing road 2. Provision of public transport facilities |
| | | Medium (5-10 years) | None |
| | | Long (>10 years) | Upgrading of Provincial Road |
| | | | |
| | Sewer | Short (0-5 years) | None |
| | | Medium (5-10 years) | 1. Upgrade for long term development 2. Construct new bulk sewer line to Pennington WWTW |

| | | | |
|--|-------|---------------------|--|
| | | Long (>10 years) | Upgrading of Pennington WWTW for future developments |
| | | | |
| | Water | Short (0-5 years) | None |
| | | Medium (5-10 years) | New bulk water line to be provided |
| | | Long (>10 years) | Upgrading of reservoir for future demand |